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BLACK WILLOW

...*an American wood*

Black willow is common to the wet areas of the eastern United States, and grows best in the lower Mississippi River Valley. It is the only commercially important willow, and is used principally by the millwork and household furniture industries. The wood is very light in weight, soft, and high in shock resistance. It glues well and accepts a number of finishes. The heartwood has a pleasant, pale reddish-brown color. However, it is not durable under conditions favorable to decay.

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Figure 1.—Natural range of black willow.

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BLACK WILLOW

...an American wood

William K. Randall[1]

DISTRIBUTION

Black willow (*Salix nigra* Marsh) is found throughout the eastern half of the United States. The northern limit of its range closely follows the 45th parallel from central Minnesota and Wisconsin east to the coast of Maine. Its eastern boundary is the Atlantic coast from Maine to Florida, its southern boundary is along the Gulf of Mexico to the mouth of the Rio Grande River. The western limit is the Rio Grande, then northward through Oklahoma, eastern Kansas, and along the Missouri River through Nebraska and Iowa to south-central Minnesota (fig. 1). There are several scattered and isolated stands throughout northern Mexico. The commercial range of black willows is in the lower Mississippi River Valley.

Throughout its range, black willow is a common tree in wet areas that are not permanently flooded. It grows near river margins and lakebeds where the soil is not very sandy. Also, it is common in swamps, sloughs, and swags, as well as on the banks of bayous, gullies, and drainage ditches.

DESCRIPTION AND GROWTH

Willows belong to the *Salicaceae* family, which is divided into two genera, *Populus* (cottonwoods and aspens) and *Salix* (willows). The generic name is derived from two Celtic words, *sal* and *lis*, which mean "near water." The species name *nigra* refers to the black bark of the mature tree.

There are approximately 300 species of willow scattered throughout the Northern Hemisphere, from the tropics northward to the Arctic Cirle. Over this broad area, willows vary in size from a few inches tall near the Arctic Circle to trees over 120 feet in height along the lower Mississippi River. Of the 70 species of willow indigenous to North America, only the black willow is important as a sawtimber tree.

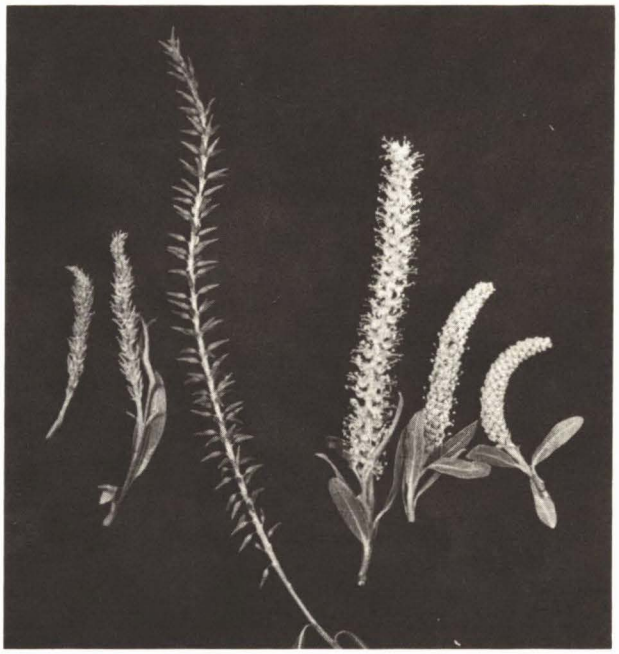

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Figure 2. —Black willow flowers showing three stages of development. Female flowers (left); male flowers (right).

Black willow trees are either male or female. The staminate flowers of the male tree produce pollen during the early spring. Insects and sometimes wind carry pollen to the pistillate flowers of the female tree (fig. 2). The seeds are borne in a catkin composed of a number of individual capsules. Seeds within the capsules are covered with a mass of cottony fibers. When the capsules open, the fibers are blown by the wind, and often the seeds are dispersed over great distances. The seeds are very small, numbering about 2 million per pound.

Willow seeds germinate within a few hours. Initial growth is rapid. After one growing season the seed-

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lings may be 5 to 7 feet tall, and in 10 years trees in natural stands in the lower Mississippi Valley can be 50 feet tall. Unmanaged black willow stands in the lower Mississippi Valley at age 25 years often contain 50 cords of pulpwood per acre. At age 35 stands have been estimated to contain 28,300 board feet of sawtimber or 66 cords of pulpwood per acre. When the trees are 50 years old, 40,000 board feet of sawtimber per acre may be available for harvest. Black willow usually dies by age 55. The oldest known black willow free from decay was 70 years.

The leaves of black willow are 3 to 6 inches long and ⅜- to ¾-inch wide, lanceolate in shape, with finely serrated edges. The bark is dark brown or nearly black, and on older trees it is broken into flaky ridges (fig. 3).

The roots must have a continuous supply of water during the growing season. Even though black willow is one of the few species of trees that can survive under long periods of complete inundation, too much water during the growing season can be detrimental when the trees are young.

Along streams where sediment is deposited, willow trees are often the first major vegetation to become established. They help to elevate the land by trapping more sediment. Often as much as 20 feet of the lower part of the tree trunk will be buried in sediment.

Black willow does not tolerate shade; it requires abundant sunlight for survival and for good growth and development. As the stands mature, more tolerant species become established, and gradually the willow is replaced.

Black willow in the South often grows in pure stands or in openings in cypress and tupelo-gum stands. Occasionally it is found scattered within overcup oak and water hickory stands. Common associates are black spruce in the North and river birch and sycamore in the Central States.

COMMON NAMES

Black willow is the preferred common name; however, it is often called simply willow. Sometimes in the South it is termed swamp willow.

SUPPLY

The lower Mississippi River Valley constitutes the commercial range of black willow. This area covers portions of the boot-heel of Missouri, western edge of Tennessee, eastern fringe of Arkansas, western Mississippi, and east and southeast Louisiana (fig. 1). Throughout this area in 1937 there were 1,503,600,000 board feet of standing black willow sawtimber. Recent sawtimber volume figures are available only for the States of Mississippi and Arkansas, which combined have a standing volume of 750 million b.f. Louisiana perhaps has an additional 300 million b.f. Total

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Figure 3.—(A) Black willow leaves; (B) bark of mature black willow.

volume of standing black willow sawtimber is probably near 1.15 billion b.f.

PRODUCTION

Annual production of black willow has increased from 1.25 million board feet in 1909 to 34.3 million board feet in 1965. Approximately one-half of the total consumption is used in the millwork and wood household furniture industries. About a third of the total consumption is used in signs and advertising and in wooden boxes. Other major industrial users are the dimension-and-flooring, glass, wood-products, metal-household-furniture, venetian-blind, mattress-and-spring, veneer-and-plywood, sawmill-and-planing, and nonferrous-metals industries.

Total production of black willow veneer in 1969 was 663,000 board feet. Slightly more than half of the production came from Arkansas. Alabama and Louisiana each produced 100,000 b.f.; Texas produced 51,000 b.f., and Tennessee, 26,000 b.f. Mississippi production was not included.

Since black willow occurs on moist sites, damage by fire is rare. However, even a very light fire will kill small trees and wound the larger trees, thereby providing an entrance to decay fungi. Insect holes, broken tops, and branch stubs are other major entrance points for decay fungi. Loss from decay fungi increases as stands mature; but, even in older stands, the total loss is small.

Cottonwood leaf beetles and willow sawflies cause growth loss by defoliating the trees. Trunkboring insects lower the value of the trees which they attack. A woodpecker (yellow-bellied sapsucker) pecks holes in the trunk, thus lowering the value of the attacked tree. Deer, cattle, and hogs can cause serious damage to young trees by stripping the leaves and feeding on the tender shoots. Beaver fell willows for food as well as material for their homes and dams.

CHARACTERISTICS AND PROPERTIES

The heartwood of black willow is pale reddish brown; the sapwood is light tan. The wood is moderately soft. Basswood, buckeye, cottonwoods, and aspens are the only North American trees softer than black willow. The wood has no characteristic odor or taste.

When a cross-section of the wood is viewed, the growth rings are relatively inconspicuous. They may be either narrow or wide, depending upon the growth of the particular tree. The wood is semi-ring to diffuse porous; the pores are barely visible to the naked eye.

Black willow wood is very weak in bending stress and crushing strength. It is moderately high in shock resistance. Its nail-holding ability is low, and due to a somewhat interlocked grain, it does not split readily.

Shrinkage during seasoning is moderately large, and care must be exercised during the drying process to prevent warping. It has, however, excellent ability to stay in place once properly seasoned.

Black willow is classed as one of the most difficult of woods to machine. It glues very well and readily accepts a number of finishes. The wood is not durable under conditions favorable to decay; it rates poorly, along with aspen, basswood, and cottonwood. Weight per cubic foot of wood is 50 pounds when green, and when air-dried, 26 pounds per cubic foot. Its specific gravity is 0.34. The only other North American hardwood that is as light is basswood. Value as a fuelwood is low.

PRINCIPAL USES

Major industrial users of willow are the millwork and household furniture industries. Other uses are doors, veneer panels, cabinetwork, toys, cutting boards, picture frames, slack cooperage, excelsior, charcoal, pulp and paper, woodenware, wooden shoes, polo balls, and artificial limbs. Freedom from checking and ease of working make willow a desirable wood for carving. Bees make a high grade of honey from willow flowers.

The first artificial legs, other than the ordinary wooden pegs, were made in London in the early part of the nineteenth century by a man named Cork. The public began to call them cork legs and generally supposed that they were made of cork instead of willow.

Vast numbers of willow poles were used to make mats for bank stabilization along the major rivers. Willow was used in the woven basket industry of the New England States. Willows were planted during the early 1900's for windbreaks and as protection from erosion. During the early days of this country, the bark was used as a home remedy for fever ailments.

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